

## CLAIMS

1. An operating mechanism for a door comprising:  
a pair of side drums operatively connected to the door;  
5 at least one pair of gas struts; and  
a pair of cable drums operatively connected to the gas struts; the cable drums and side drums being coaxially mounted for simultaneous rotation; whereby the side drums and cable drums are rotatable in a first direction to close the door and in a second direction to open the door; and when the side  
10 and cable drums are rotated in the first direction, the gas struts are charged and when the side and cable drums are rotated in the second direction, the gas struts are discharged.
2. The door operating mechanism as claimed in claim 1, in which each of  
15 the side drums is operatively connected to the door by a first cable.
3. The door operating mechanism as claimed in claim 2, in which each first cable has a first end and a second end; and the first end is connected to the side drum and the second end is adapted to be attached to the sides  
20 of the door, proximate the door bottom.

4. The door operating mechanism as claimed in claim 2, in which each side drum is helical and includes a plurality of concentric graduations of increasing diameter and the first cable is wound onto or off of the graduations as the side drum rotates.

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5. The door operating mechanism as claimed in claim 4, in which each graduation includes a groove and a lip; and the first cable is wound onto and off of the grooves of the graduations.

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6. The door operating mechanism as claimed in claim 1, in which each gas strut is operatively connected to its respective cable drum by a second cable, the second cable being wound onto or off of the cable drum as the cable drum rotates.

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7. The door operating mechanism as claimed in claim 6, wherein the first cable is wound onto the side drum when the second cable is unwound from the cable drum and wherein the first cable is unwound from the side drum when the second cable is wound onto the cable drum.

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8. The door operating mechanism as claimed in claim 6, in which the cable drums and side drums are mounted on a single shaft and the cable

drums are mounted proximate the ends of the shaft and the side drums are mounted inwardly of the cable drums.

5 9. The door operating mechanism as claimed in claim 6, further comprising a pairs of shiv wheels, each shiv wheel being operatively connected to one of the gas struts, each shiv wheel being configured to receive the respective second cable therearound;

a pair of spaced apart guide tracks; and

10 a pair of brackets, each bracket operatively attaching one of the shiv wheels to one of the guide tracks, whereby the brackets and shiv wheel move along the guide tracks toward or away from the cable drum as the second cable is wound respectively onto and off of the cable drum.

15 10. The door operating mechanism as claimed in claim 9, in which the guide tracks are mounted substantially parallel to the ceiling of the building in which the door is installed.

11. The door operating mechanism as claimed in claim 9, in which the guide tracks are mounted on either side of the door opening.

12. The door operating mechanism as claimed in claim 9, in which the second cable has a first end which is connected to the cable drum and a second end which is connected to the guide track.

5 13. The door operating mechanism as claimed in claim 9, further comprising:  
a connector;  
a hole formed in the shiv wheel; and  
a vertically aligned slot formed in the bracket,

10 whereby the shiv wheel is connected to the bracket by the connector being received through the vertically aligned slot and the hole and the connector is able to partially slide up and down within the vertically aligned slot as the shiv wheel moves toward or away from the cable drum.

15 14. The door operating mechanism as claimed in claim 9, in which the gas strut includes a cylinder and a piston rod and the shiv wheel is connected to the piston rod.

20 15. The door operating mechanism as claimed in claim 14, in which the gas strut is connected to the piston rod by an U-shaped bracket, whereby the movement of the shiv wheel toward the cable drum as the door closes causes the piston rod to be forced into the cylinder; and the movement

of the shiv wheel away from the cable drum as the door is opened allows the piston rod to withdraw from the cylinder.

- 5           16.   The door operating mechanism as claimed in claim 1, further comprising a second gas strut operatively connected to the gas strut.

17.   The door operating mechanism as claimed in claim 16, in which the gas strut and second gas strut are at least partially disposed within a cylindrical tube.

- 10           18.   The door operating mechanism as claimed in claim 17, in which the gas strut and second gas strut are able to at least partially telescope into and out of the tube.

- 15           19.   The door operating mechanism as claimed in claim 18, in which each of the gas strut and second gas strut include a piston rod and a cylinder; and the piston rod of the second gas strut is connected to the cylinder of the gas strut.

- 20           20.   The door operating mechanism as claimed in claim 19, further comprising a connector plate;

at least one connector; and

in which the piston rod of the second gas strut is connected to the cylinder of the gas strut by the connector plate and the at least one connector.

5           21. The door operating mechanism as claimed in claim 20, further comprising:

          a pair of first cables, each first cable operatively connecting the door to the respective side drum;

          a pair of second cables; each second cable operatively connecting the  
10       respective cable drum to the gas strut;

          a pair of guide tracks;

          a pair of brackets, each bracket being adapted to slide along the respective guide track;

          a pair of shiv wheels, each shiv wheel being attached to its respective  
15       bracket and each shiv wheel being configured to receive the respective second cable therearound; and

in which the shiv wheels and brackets are moved along the guide tracks toward or away from the cable drums as the second cables are wound respectively onto and off of the cable drums.

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22. The door operating mechanism as claimed in claim 21, in which the combined stroke of the gas strut and second gas strut is in the range of 15 to 30 inches.

5 23. A door operating mechanism for opening and closing a sliding door; the mechanism comprising:

a shaft adapted to be mounted proximate an opening in a wall;

a pair of side drums mounted proximate opposing free ends of said shaft;

10 a pair of cable drums, each cable drum being mounted between one of said side drums and the corresponding free end of the shaft;

a pair of first cables, each of said first cables connected at one end to one of said side drums and being adapted to be connected to the bottom of on side of the door; each of said first cables being windable onto and off of said corresponding side drum;

15 a pair of guide tracks;

a pair of shiv wheels, each of said shiv wheels being mounted for reciprocal movement along one of said guide tracks;

20 a pair of second cables, each of said second cables secured at one end to one of said cable drums and at the other end to one of said guide tracks, and in which each of said second cables is wound at least partially around one of said shiv wheels;

at least one pair of gas struts, each of said gas struts being operationally connected to one of said shiv wheels; in which rotational movement in the shaft causes the first cables to be wound either onto or off of the side drums and simultaneously causes the second cables to be wound either onto or off of the cable drums, and further causes motion in said shiv wheels thereby either charging or discharging the gas struts.

24. The door operating mechanism of claim 23, in which the side drums are helical and include a plurality of concentric graduations of increasing diameter and the respective first cables are each wound onto or off of the graduations.

25. The door operating mechanism of claim 24, further comprising a second gas strut, the second gas strut being operatively linked to the gas strut.

26. The door operating mechanism of claim 25, in which each gas strut and second gas strut are contained within a tube and the gas strut and second gas strut telescope at least partially in and out of the tube in response to movements by the respective shiv wheel.



27. The door operating mechanism of claim 26, in which the gas strut and second gas strut have a combined stroke in the range of 15 to 30 inches.

28. The door operating mechanism of claim 27, in which each pair of the gas strut and second gas strut are mounted at an inclined angle relative to the guide track.

29. The door operating mechanism of claim 28, in which each bracket includes a slot that allows for slight vertical movement of the shiv wheel as it moves along the guide track.

30. The door operating mechanism of claim 28, in which the guide tracks are mounted substantially parallel to the ceiling of the building in which the door is installed.

31. The door operating mechanism as claimed in claim 28, in which the guide tracks are mounted on either side of the door opening.

32. A method of raising or lowering a door comprising the steps of:

a) providing a door operating mechanism having:

a pair of side drums operatively connected to the door;

at least one pair of gas struts; and

a pair of cable drums operatively connected to the gas struts; the

cable drums and side drums being coaxially mounted on a shaft for

5 simultaneous rotation; whereby the side drums and cable drums are rotatable

in a first direction to close the door and in a second direction to open the door;

and when the side and cable drums are rotated in the first direction, the gas

struts are charged and when the side and cable drums are rotated in the second

direction, the gas struts are discharged;

10 b) actuating the door operating mechanism so as to cause the rotation of  
the shaft so that the side drums and cable drums rotate in one of the first  
direction and second direction to respectively open or close the door.